DIP
DIGITAL INFORMATION PLATFORM

Overview to Collins
Jan 9, 2023

Mirna Johnson, DIP Sub-Project Manager
Gilbert, DIP Deputy SPM
Swati Saxena, Tech Lead

SWIM   Weather

Digital Information Platform

*Accelerate NAS transformation for advanced, **data-driven, digital services** to promote **efficient aviation operations***

Cloud-based ecosystem that takes data from many sources and turns it into easily accessible, easy-to-use digital information to expand the development of reusable airspace management services

Current State
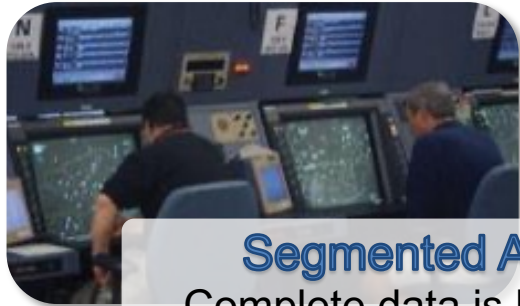
Segmented ATM Systems
Complete data is hard to access which limits data-driven solutions from entering the market

Inconsistent Data Quality
Hard to decipher data and thus consume which prevents from developing innovative advanced solutions

Hard to access and decipher data to provide advanced digital services for digital NAS transformation
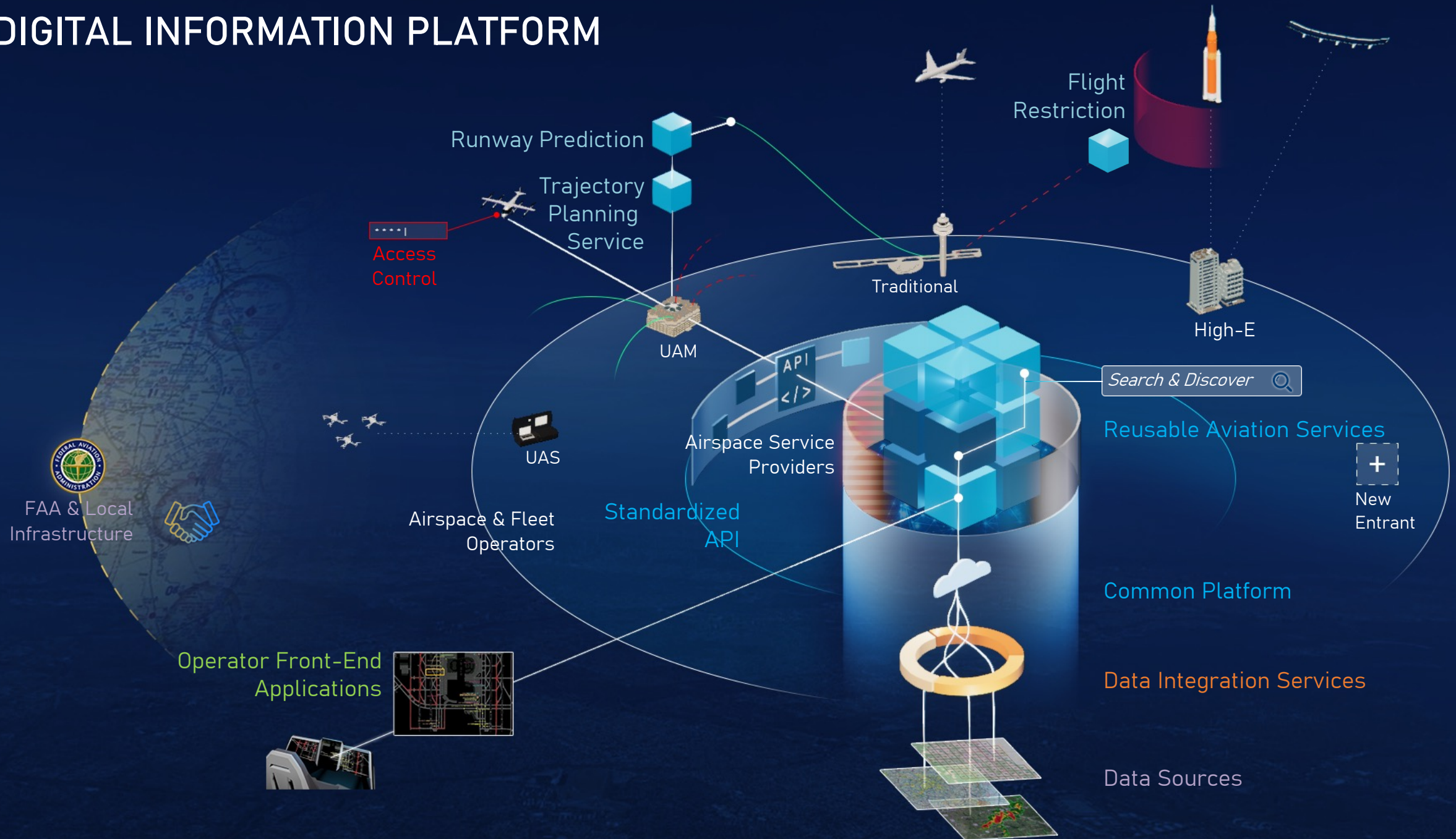
Demand for Sustainable Operations
Lack of reusable solutions to build more advanced solutions that can optimize efficiency

Limited Paths to Enter Market
Hard-to-deploy solutions which limits market entry

More Complex Operations
require higher levels of synchronization and holistic solutions for fully informed decision making

DIGITAL INFORMATION PLATFORM

Digital Information Platform for Sustainability Services

Current Limitations

Segmented ATM Systems

Inconsistent Data Quality

Limited Paths to Enter Market

Demand for Sustainability

Problem Statement:
Hard to access and decipher data to provide advanced digital services for digital NAS transformation
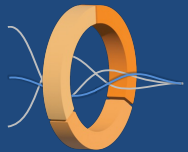
Pursued Solution:
Pave the way for improving data accessibility to enable high-reuse digital service solutions that can scale and be more quickly discovered on a platform

Digital Services
Building blocks for reuse

Data Integration
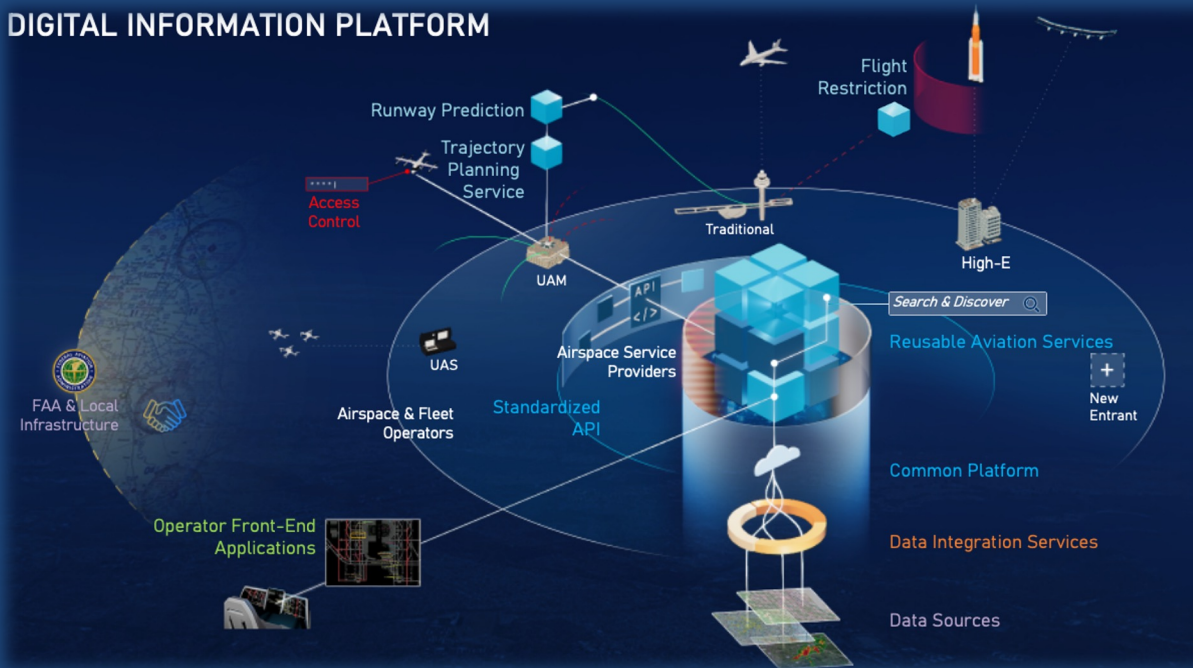*Combine and simplify data for holistic information*

Common Platform
Cloud-based (smaller) footprint and standard APIs for simpler integration

DIGITAL INFORMATION PLATFORM

Advanced Technologies
Apply ML/AI to improve adaptability and extensibility of services

Performance Monitoring
Promote quality and build trust in information

Sustainability
Inform decision making to optimize efficiency

DIP Research Areas

NASA Led DIP-Enabled Services for Sustainability

Ground and flight deck services focused on improving the sustainability of aviation operations

"SFNP-Ops Demos"

Industry Led Partner Service Evaluations

Integration and demonstration of Partner services with DIP for validation of the platform

"PS Evals"

University Challenges

Development of innovative solutions and advanced algorithms for aviation services

Reference Digital Information Platform (DIP)

Development of a platform for advanced, data-driven, digital services for flight operators and service consumers

DIP-Enabled Services for Sustainability

TECHNOLOGY

SUSTAINABLE AVIATION FUEL

ALTERNATIVE FUEL

OPERATIONS AND INFRASTRUCTURE
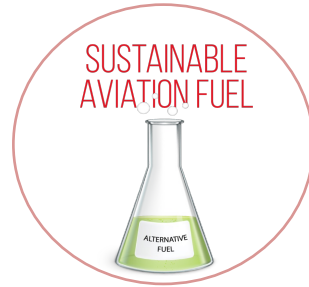
GLOBAL Aviation Industry's Goal:
50% reduction in carbon emissions by 2050 relative to 2005 and possible net zero emissions by 2060 through these three means
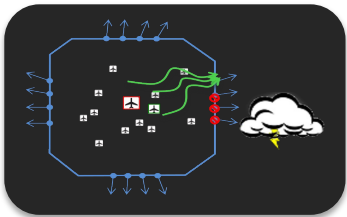
Collaborative Digital Departure Reroute (SFNP-Ops-1, FY22-25)

Sustainable Oceanic Airborne Re-Routing (SFNP-Ops-2, FY26)

Irregular Ops Recovery/ Disruption Management (SFNP-Ops-3, FY27)

4D Trajectory Optimization (SFNP-Ops-4, FY28)

SFNP-Ops = Sustainable Flight National Partnerships - Operations

DIP Supports Sustainability Goals: Deliver reduction in emissions and fuel of aviation operations through digital services technology

NASA Services Via the Platform for PS Evals

NASA's Building Blocks

- CDDR TOS Service
  - TOS UI
  - TOS Data
- NAS Terminal Scheduler
- ML models
  - On Time Prediction
  - Taxi Time Prediction
  - Runway Prediction
  - Configuration Prediction
- Airport Surface Model Orchestrator
  - TMI Service
  - Config Data Source D-ATIS
  - Weather Data Source (Lamp)
  - NASA Fuser (integrated data)
- SWIM: TFMS, TFDM, STARs, TBFM, ERAM
- OTHER: Airlines, OIS, Airports

DIP Platform APIs

- CDDR User Interface
- CDDR Data
- ML ON Time pred
- ML Taxi Times pred
- ML Runway pred
- ML Config pred
- NAS-Wide TMI Service
- NAS-Wide Weather
- NAS-Wide Fuser
- Flight Data
  Arrival Runway
  Departure Runway
  Taxi IN/OUT

Available for NTX and later on for other Airspaces (SA-1b)

Extension of ML models to other airspaces

+ Partners' services

TBD New REST API Services ?